

REMARKS

Claim 1 has been amended. New claims 13-15 have been added. Thus, Claims 1 and 4-15 are pending in the present application. Support for new claim 13 may be found in the specification at Examples 7-10. Support for new claim 14 may be found in the specification at page 10, lines 5-8. Support for new claim 15 may be found in the specification at page 7, line 9 (general formula (II-a)). Thus, no new matter has been added. Reconsideration of the application in view of the following comments is respectfully requested.

Information Disclosure Statement

The Examiner stated that the IDS filed on October 2, 2007 failed to comply with 37 CFR 1.97(d) because it lacked a statement as specified in 37 CFR 1.97(e). Enclosed herewith is the same IDS as filed on October 2, 2007. Because this IDS is being filed with an RCE, no such statement is required. In addition, since the foreign patent documents listed on the enclosed PTO/SB/08 Equivalent were submitted on October 2, 2007, duplicate copies are not being provided. Thus, Applicants respectfully request consideration of the references listed on the IDS, and that the initialed PTO/SB/08 Equivalent be returned with the next communication.

Claim objection

The Examiner objected to claim 1 because it contained more than one period. Appropriate correction has been made. Thus, reconsideration and withdrawal of the claim objection are respectfully requested.

Rejections under 35 U.S.C. 103(a)

Malik et al. (6,133,412) in view of Malik et al. (SPIE Vol. 3678)

The rejection of Claims 1 and 4-11 under 35 U.S.C. 103(a) as being unpatentable over Malik et al. (6,133,412) in view of Malik et al. (SPIE Vol. 3678, 1999) was maintained.

The Advisory Action states that "claim 1 requires that resin component (A) is a polymer." (see Advisory Action, paragraph 2, line 11). However, present claim 1 recites that "The resin component (A) is a mixture of a polymer and a copolymer." Claim 1 has been amended to more distinctly recite this feature. Moreover, the Advisory Action states that Applicants point to their

Examples 7-10 to show comparative results but do not limit their claims to the compositions in those examples as evidenced by using "comprising" when claiming the copolymer (see Advisory Action, page 4, lines 6-7). Claim 1 as amended recites that the copolymer "consists essentially of", rather than "comprises", thus only encompassing the specified structural units "and any components that do not materially affect the basic and novel characteristic(s)" of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in original). Thus, the unexpected results discussed in Applicants' previous response filed on October 2, 2007 (rectangular cross-sectional shape or resist pattern, no pattern collapse and improved level of etching resistance) are clearly commensurate in scope with the claims.

Moreover, the Advisory Action states that "Copolymers are generally inclusive of any number of [mono]mers with 2 being the minimum number (see Advisory Action, page 3, lines 17-18)." However, neither Malik et al (US6,133,412) nor Malik et al (SPIE Vol.3678) teach or suggest, either alone or in combination, the specific mixture recited in present claim 1. Thus, the general teaching in these references of a copolymer does not suggest the invention as presently claimed in Claim 1.

Malik et al. (6,133,412) in view of Malik et al. (SPIE Vol. 3678, 1999) further in view of Pasini et al. (SPIE 3676, 1999) and Hein et al.

The rejection of Claim 12 under 35 U.S.C. 103(a) as being unpatentable over Malik et al. (6,133,412) in view of Malik et al. (SPIE Vol. 3678, 1999) further in view Pasini et al. (SPIE Vol. 3678, 1999) and Hein et al. (SPIE 4345, 2001) was maintained.

Neither Malik et al (6,133,412) nor Malik et al (SPIE Vol. 3678) recites an adamantyl group. Moreover, neither Malik et al (6,133,412) nor Malik et al (SPIE Vol. 3678) recites the structure of the acetal and adamantyl groups recited in claim 12. Pasini et al does not recite an acetal group. Moreover, Pasini et al does not recite the structure of an acetal and an adamantyl group as recited in claim 12. The acid dissociable, dissolution inhibiting group in tert-butylmethacrylate recited in Hien et al. is a tert-butyl group. Even if this tert-butyl was replaced by an adamantyl group, an acetal could not be produced.

The present application discloses that a resist pattern which exhibits favorable rectangularity (not tapered) can be obtained by having an acetal and an adamantyl group. Furthermore, in the general formula (II) in the present specification, in which X is an adamantyl group (equivalent to the Examples 1 and 2), there is greater etching resistance, pattern shape (rectangular) and resolution than those of the case where X is a naphthyl group (equivalent to the Examples 3 and 4) or an ethoxyethyl group (equivalent to the Comparative Example 1). Thus, protection by an adamantyl group results in greater etching resistance, pattern shape (rectangular) and resolution than does protection by a naphthyl group as recited in Malik et al (6,133,412) and Malik et al (SPIE Vol. 3678).

Thus, Malik et al (6,133,412), Malik et al (SPIE Vol. 3678), Pasini et al, or Hien et al do not recite the structure of an acetal and an adamantyl group, or the unexpectedly advantageous effects of these two groups as disclosed in the present application. Thus, these unexpected results would effectively rebut any finding of *prima facie* obviousness.

Unexpected results

The evidence that supports the showing of unexpected results includes the favorable rectangularity and superior isolated line pattern discussed above, as well as the following:

Examples 7-10, where mixed resins are used as recited in claim 1, resulting in rectangular cross-sectional shape of resist pattern and no pattern collapse (Example 7) and an excellent level

of etching resistance (Examples 8-10).

Examples 1, 2, 5 and 6, where single (not mixed) resins and protection by adamantyl groups are used (claim 12), resulting in excellent resolution, rectangular cross-sectional shape of the resist pattern and no pattern collapse (Example 1); and an excellent level of etching resistance (Examples 2, 5 and 6).

Comparative Example 1 uses a resin protected by 1-ethoxyethyl groups which is not encompassed by the present claims, resulting in an inferior etching resistance to that observed in Examples 1-10. Furthermore, some pattern collapse was also observed in connection with Comparative Example 1.

Examples 3 and 4 are additional examples in which a protecting group other than adamantyl was used. In these examples, the protecting group is a naphthyl group. In both examples, etching resistance was only 10% better than the inferior results seen with Comparative Example 1. Moreover, the shape of the resist pattern was tapered, rather than being completely rectangular.

Thus, Examples 7-10 and Examples 1, 2, 5 and 6 indicate not only a much improved level of etching resistance in comparison to Comparative Example 1 and Examples 3-4, but also superior results in terms of prevention of pattern collapse and in rectangularity of the resist pattern. That is, the constituent features that "The component (A) is a mixture of a polymer and a copolymer (present claim 1)." and "The acid dissociable, dissolution inhibiting groups have adamantyl groups (present claim 12)" result in a positive resist composition that has significant unexpected, advantageous properties.

The Pasini reference does disclose that "little or no deprotection of the adamantly esters occurs in our polymers under the action of photogenerated strong acids." Pasini at page 97, last paragraph. However, nothing in Pasini would lead of ordinary skill in the art to expect the significantly more favorable rectangularity and superior isolated line pattern obtained using the presently claimed invention. In particular, the superior rectangular cross-sectional shape of the resist pattern and lack of pattern collapse are significant unexpected results that could not have been predicted in view of the prior art. These unexpected results are strong evidence of the patentability of the claimed invention.

In view of the claim amendments and comments presented above, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §103(a).

CONCLUSION

In view of the foregoing amendments and comments, it is respectfully submitted that the present application is fully in condition for allowance, and such action is earnestly solicited. If any minor issues remain which could be resolved by telephone, the Examiner is invited to contact the undersigned at the number provided below.

Respectfully submitted,

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